

During each swoop the adult male wolf jumped up at the eagle. On the fifth sortie the eagle swooped much lower and was caught and killed by the wolf, but was not eaten. The male wolf resumed feeding on the blackbuck carcass and the pack abandoned the carcass around 1000 H, ignoring the dead eagle.

Interactions between raptors and wolves have been rarely reported (L.D. Mech 1970, *The wolf. The ecology and behavior of an endangered species*. Doubleday, New York, NY U.S.A.). Several reports involve interactions between wolves and common ravens (*Corvus corax*) since they often feed on the same carcasses (R.O. Peterson 1977, *Wolf ecology and prey relationships on Isle Royale*. U.S. Natl. Park Serv. Sci. Monogr. Ser. No. 11.). Ravens irritate wolves by swooping low over their heads and landing nearby (L. Crisler 1958, *Arctic wildlife*. Harper and Row, New York, NY U.S.A.; L.D. Mech 1966, *The wolves of Isle Royale*. U.S. Natl. Park Serv. Ser. No. 7). Wolves, in turn, leap at ravens in the air, stalk them on the ground, and scatter them from kills. I have also seen wolves chase crows (*Corvus* spp.) from their kills in a similar way. During Isle Royale wolf studies, a wolf was observed catching and killing a raven (Peterson 1977). The wolves played with the carcass of the raven for 15 min and did not eat it.

This is the first record that I am aware of of a short-toed eagle trying to scavenge a predator's kill or attack its young. This eagle is not reported to be a scavenger in the existing literature. The short-toed eagle is reported to feed mainly on snakes, and secondarily on lizards, amphibia, mice, and other mammals (to hare size), and birds as large as guineafowl (S. Ali and S.D. Ripley 1987, *Handbook of the birds of India and Pakistan*, Oxford Univ. Press, Bombay, India; T.J. Roberts 1991, *The birds of Pakistan*. Vol. 1, Oxford Univ. Press, Karachi, Pakistan).

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THE USE OF A ROCK BY AN OSPREY IN AN AGONISTIC ENCOUNTER

Whereas many birds manipulate material to build nests, and some use tools to procure food (H.B. Lovell 1958, *Wilson Bull.* 70:280–281; G.C. Millikan and R.I. Bowman 1967, *Living Bird* 6:23–41; J. Boswell 1977, *Avic. Mag.* 83:88–97), it is unusual to observe a bird using an object in an aggressive encounter. I report the use of a rock in an agonistic encounter by a male osprey (*Pandion haliaetus*).

I observed the rock-dropping incident close to an active osprey nest in Stonington, Connecticut on 8 July 1989. The nest was located in a salt-water marsh to the west of Wilcox Point and adjacent to Long Island Sound and Quiambaug Cove. A railroad track passed within approximately 100 m of the nest and a series of utility poles ran along the side of the railroad bed. I observed the nest from 1310–1710 H on 8 July 1989 with a 15–45× telescope and 9 × 35 binoculars (see J.P. Roche 1995, *Conn. Warbler* 15:74–77). I was approximately 200 m from the nest and 100 m from the site where the tool was used.

At 1438 H the female osprey began giving alarm calls (A.F. Poole 1989, *Ospreys*, Cambridge Univ. Press, Cambridge, U.K.) from the nest as one male osprey flew into the nest area, followed shortly by three more males. The second male to enter the area (osprey A) was carrying a partly-eaten alewife (*Alosa pseudoharengus*). During the next 22 min, the number of males in the nest area fluctuated between two and four; throughout this period these males behaved aggressively toward each other.

At 1456 H osprey A flew to a pole along the railroad bed and perched. Next, another male (osprey B) flew to the ground, picked up a small rock in its talons from the railroad bed, flew approximately 1 m above osprey A, and dropped the rock on osprey A. Osprey A, which appeared startled but unhurt, flew down to the ground immediately. Osprey A then flew to another pole and perched. Osprey B flew at osprey A again and displaced it from the pole. Osprey A then flew inland, away from the nest area. Osprey A returned at 1459 H to perch again at the side of the railroad bed, but left the area within 2 min. It still had the alewife in its talons when it left.

By 1502 H the female on the nest had stopped calling and osprey B was the only male that remained in the area.

Because the female had stopped calling while osprey B was still in view, it is likely that osprey B was her mate; the female generally called in the presence of intruders and never called when only her mate was present. In addition, osprey B behaved aggressively toward all of the males entering the nest area. Osprey B left the nest area without returning to the nest, however, so the identification of osprey B is not certain.

The use of a rock as a tool by an osprey has not previously been reported. Rock-dropping behavior has been reported in Egyptian vultures (*Neophron percnopterus*), which drop rocks on ostrich (*Struthio camelus*) eggs to open them (J. Alcock 1970, *Ibis* 112:542). Rock dropping has also been reported by Janes (1976, *Condor* 78:409), who observed nesting common ravens (*Corvus corax*) dropping rocks on human intruders. Hypotheses explaining the osprey's rock-dropping behavior include the following: (1) if osprey B was the breeding male at the Wilcox West nest, it may have used the rock to displace an intruding male from the nest area, or (2) the rock-dropping behavior may have been displacement activity, irrelevant behavior produced by the interplay of conflicting drives (J.L. Gould 1982, *Ethology*, Norton, New York, NY U.S.A.).

Some birds have been observed to demonstrate considerable intelligence (e.g., T.H. Turney 1982, *Bull. Psychon. Soc.* 19:59–62; I.M. Pepperberg 1983, *Anim. Learn. Behav.* 11:179–185); the observed incident of rock-dropping by an osprey suggests the possibility that ospreys are capable of insight learning (see J.C. Welty and L. Baptista 1988, *The life of birds*, Saunders, New York, NY U.S.A.). Osprey B may have redirected a nest-material-carrying mechanism to solve a new problem: that of an agonistic encounter with osprey A. Heinrich (1988, *Condor* 90:271–274) suggested that the rock-dropping behavior observed in ravens by Janes may have been purposeless displacement activity. This hypothesis could also explain the rock-dropping behavior of osprey B.—**John P. Roche, Department of Biological Sciences, Central Connecticut State University, New Britain, CT U.S.A.** Present address: Center for the Integrative Study of Animal Behavior, Indiana University, 402 N. Park Ave., Bloomington, IN 47405 U.S.A.

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WINTER CARRION FEEDING OF RED-TAILED HAWKS IN OKLAHOMA

The red-tailed hawk (*Buteo jamaicensis*) is one of the best-known, most widely distributed hawks in North America (P.A. Johnsgard 1990, *Hawks, eagles, and falcons of North America*. Smithsonian Inst. Press, Washington, DC U.S.A.; C.R. Preston and R.D. Beane 1993, *Red-tailed hawk*. Pages 1–24 in *The birds of North America*, No. 52. Acad. Nat. Sci., Philadelphia, PA U.S.A.). Studies of red-tailed hawk diets revealed that the prey was mainly small mammals, but also birds, reptiles, amphibians, and insects (S.K. Sherrod 1978, *Raptor Res.* 12:49–121; Johnsgard 1990; Preston and Beane 1993). Red-tailed hawks usually hunt live prey; incidents of carrion feeding in this species are few and scattered (Sherrod 1978). However, carrion feeding is difficult to document using traditional pellet and stomach content analyses (P.L. Errington 1933, *Condor* 35:19–29; P.L. Errington and W.J. Breckenridge 1938, *Wilson Bull.* 50:113–121; Preston and Beane 1993). Here we report three observed incidences of carrion feeding by adult red-tailed hawks in northcentral Oklahoma during late winter 1993.

On 26 February 1993, at about 1000 H, an adult red-tailed hawk was observed feeding on the decaying carcasses of fish in the backyard of a home in Meeker, Oklahoma. Several domestic cats (*Felis domesticus*) were feeding on the fish when the hawk chased them away. The hawk then fed on the fish for almost 15 min, and it returned several hours later on the same day to continue feeding on the fish. On 1 March 1993, at about 1645 H, an adult red-tailed hawk was seen perched on a freshly killed domestic cat in the middle of a small, two-lane paved road in Stillwater, Oklahoma. The hawk was observed to feed on the cat for about 20 min. On 2 March 1993, at about 1330 H, an adult red-tailed hawk was seen sitting on the carcass of an adult eastern cottontail (*Sylvilagus floridanus*) along the shoulder of a two-lane highway approximately 6.5 km west of Stillwater, Oklahoma. The hawk was observed to feed on the rabbit for about 15 min, interrupted only by passing cars.

Small amounts (<2% of diet) of mammalian and avian carrion were found in red-tailed hawk winter diets in Iowa, Wisconsin, Minnesota, South Dakota, and California (Errington 1933, *Condor* 35:19–29; Errington and Breckenridge 1938, *Wilson Bull.* 50:113–121; Fitch et al. 1946, *Condor* 48:205–234). Carrion made up only 1.2% of the red-tailed hawk diet from across the U.S. with all 13 cases of suspected carrion feeding occurring between mid-November and